

## Overview

The Tio1608-D2 is a Dante-equipped I/O rack with 16 microphone/ line inputs and 8 line outputs.



## Features

- 2U size, 16 inputs and 8 outputs.
- Dante network protocol contributes to greater system scalability and flexibility
- Easy configuration using the AUTO CONFIG function of the DM3 or the QUICK CONFIG function of the TF Series
- Features recallable D-PRE preamplifiers
- Dimensions (W x H x D): 480mm x 88mm x 364mm (18.9" x 3.5" x 14.4")
- Net Weight: 5.7kg (12.6lbs)

## Specifications

1/3

### General Specifications

Output impedance of signal generator: 150ohms

Measured with another Tio1608-D2 through Dante network.

### Frequency Response Fs = 20Hz-20kHz, refer to the nominal output level @1kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	GAIN: +66dB.	-1.5	0	0.5	dB

### Total Harmonic Distortion Fs = 44.1kHz or 48kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	+4dBu@20Hz-20kHz, GAIN: +66dB.			0.1	%
		600Ω	+4dBu@20Hz-20kHz, GAIN: -6dB.			0.05	%

Fs = 88.2kHz or 96kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	+4dBu@20Hz-20kHz, GAIN: +66dB.			0.2	%
		600Ω	+4dBu@20Hz-20kHz, GAIN: -6dB.			0.05	%

\* Total Harmonic Distortion is measured with a -18dB/octave filter @80kHz

### Hum & Noise Fs = 48kHz, EIN: Equivalent Input Noise

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	Rs=150Ω, GAIN: +66dB.		-128		dBu
			EIN		-62		dBu
		600Ω	Rs=150Ω, GAIN: -6dB.		-84	-80	dBu
all Inputs	OUTPUT 1-8	600Ω	Rs=150Ω, GAINs: -6dB.			-70	dBu
-	OUTPUT 1-8	600Ω	Residual output noise.		-88		dBu

Fs = 96kHz, EIN: Equivalent Input Noise

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	Rs=150Ω, GAIN: +66dB.		-128		dBu
			EIN		-62		dBu
		600Ω	Rs=150Ω, GAIN: -6dB.		-84	-80	dBu
all Inputs	OUTPUT 1-8	600Ω	Rs=150Ω, GAINs: -6dB.			-70	dBu
-	OUTPUT 1-8	600Ω	Residual output noise.		-86		dBu

\* Hum &amp; Noise are measured with A-weighting filter.

### Dynamic Range Fs = 48kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	AD + DA, GAIN: -6dB.		108		dB
-	OUTPUT 1-8	600Ω	DA Converter		112		dB

Fs = 96kHz

Input	Output	RL	Conditions	Min.	Typ.	Max.	Unit
INPUT 1-16	OUTPUT 1-8	600Ω	AD + DA, GAIN: -6dB.		108		dB
-	OUTPUT 1-8	600Ω	DA Converter		110		dB

\* Dynamic Range are measured with A-weighting filter.

## Specifications

2/3

### Crosstalk@1kHz

from/to	to/from	Conditions	Min.	Typ.	Max.	Unit
INPUT n	INPUT (n-1) or (n+1)	INPUT 1-16 adjacent inputs, GAIN: -6dB.			-100	dB
OUTPUT n	OUTPUT (n-1) or (n+1)	OUTPUT 1-8, input to output			-100	dB

\* Crosstalk is measured with a -30dB/octave filter @22kHz

### Sampling Frequency

		Conditions	Min.	Typ.	Max.	Unit
External Clock	Frequency Range	44.1kHz / 48kHz / 88.2kHz / 96kHz	-200		200	ppm
		+4.1667%/+0.1%/-0.1%/-4.0% to all of the above	-200		200	ppm

### Power Requirements

		Conditions	Min.	Typ.	Max.	Unit
Power Requirements		100-240V 50/60Hz			50	W
Heat Dissipation		100-240V 50/60Hz			43.5	kcal/h

### AC Cable Length and Temperature Range

		Conditions	Min.	Typ.	Max.	Unit
AC Cable Length				2.5		m
Temperature Range		Operating temperature range	0		40	°C
		Storage temperature range	-20		60	°C

### Dimensions (W x H x D) & Net weight

480(W) x 88(H) x 364(D) mm, 5.7kg

## Specifications

3/3

### Input Output Digital I/O Character

#### Analog input characteristics

Input Terminals	GAIN	Actual Load Impedance	For Use With Nominal	Input Level			Connector	Balanced / Unbalanced
				Sensitivity *1	Nominal	Max. before clip		
INPUT 1-16	+66dB	7.5kΩ	50-600Ω Mics or 600Ω Lines	-82dBu (61.6μV)	-62dBu (0.616mV)	-42dBu (6.16mV)	Combo Jack (XLR 3-hole chassis *2 or TRS phone *3)	Balanced
	-6dB			-10dBu (245mV)	+10dBu (2.45V)	+30dBu (24.5V)		

In these specifications, 0dBu = 0.775Vrms.

+48V DC (phantom power) can be supplied to INPUT XLR type connectors via each individual software controlled switch.

\*1. Sensitivity is the lowest level that will produce an output of +4dBu (1.23V) or the nominal output level when the unit is set to maximum gain.

\*2. 1: GND, 2: HOT, 3: COLD

\*3. Tip: HOT, Ring: COLD, Sleeve: GND

#### Analog output characteristics

Output Terminals	Actual Source Impedance	For Use With Nominal	Output Level		Connector	Balanced / Unbalanced
			Nominal	Max. before clip		
OUTPUT 1-8	75Ω	600Ω Lines	+4dBu (1.23 V)	+24dBu (12.3 V)	XLR-3-32 type *1	Balanced

In these specifications, 0dBu = 0.775Vrms.

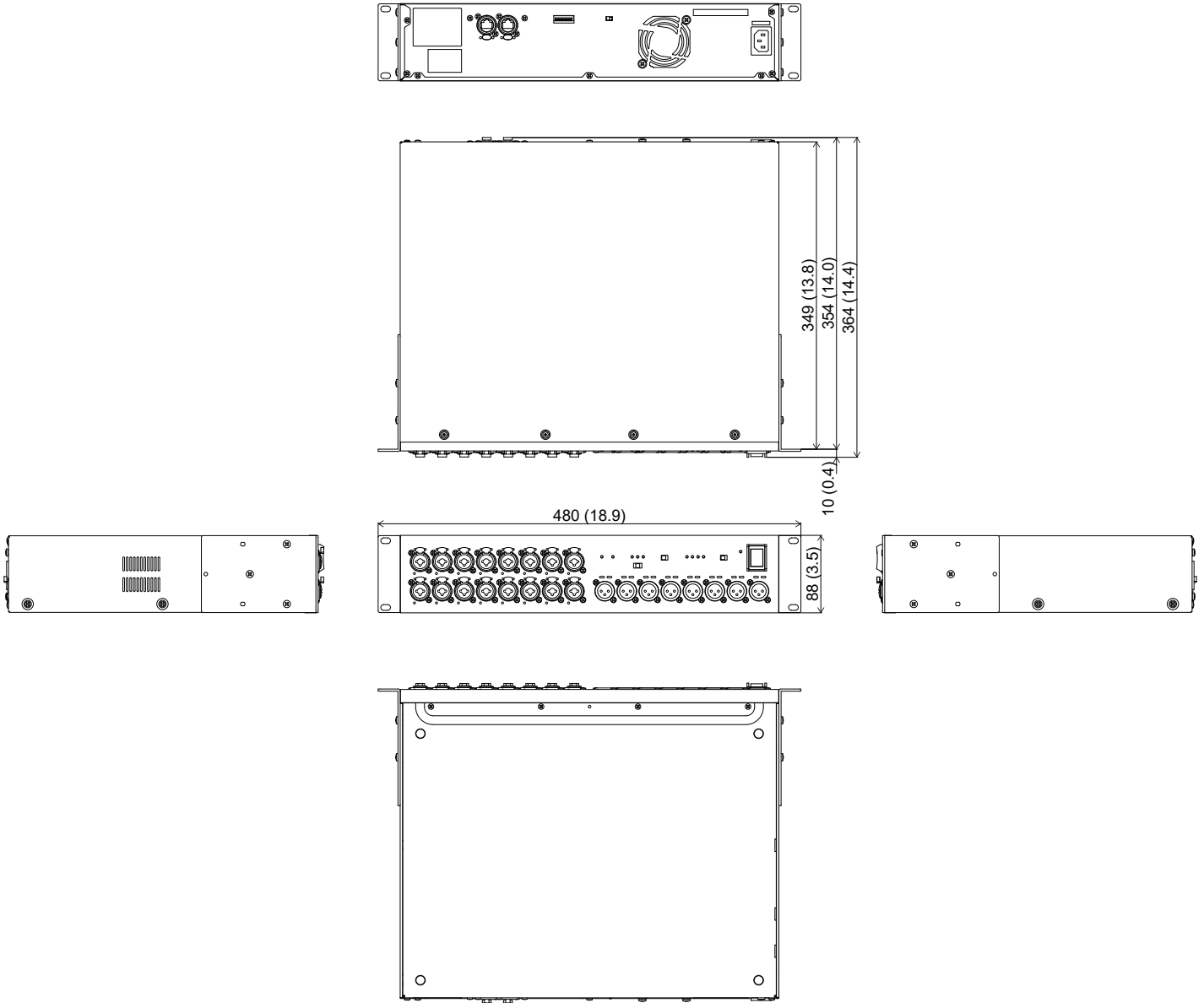
\*1. 1: GND, 2: HOT, 3: COLD

#### Digital input/output specifications

Terminal	Format	Data Length	Level	Audio	Connector
Primary / Secondary	Dante	24 or 32bit	1000BASE-T	16ch (Tio1608-D2 to other devices) 8ch (Other devices to Tio1608-D2)	etherCON Cat5e

## Dimensions

Unit: mm (inch)



## Software

- R Remote

## Architectural and Engineering Specifications for Tio1608-D2

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The Yamaha Tio1608-D2 shall be a 2U-size I/O rack with 16 balanced analog mic/line inputs using Combo jack sockets and 8 balanced analog line outputs using XLR 3-pin chassis connectors. It shall support sampling frequencies of 44.1kHz, 48kHz, 88.2kHz and 96kHz. Input gain shall range from -6dB to +66dB with a maximum input level before clipping of +30dBu. Maximum output level before clipping shall be +24dBu, with a nominal output level of +4dBu. It shall have built-in Dante digital audio networking capability with primary and secondary network connections for reliable, flexible system setup and configuration. The front panel shall include status LED indicators for audio input and output, Dante System and Sync. Switches shall be provided to enable +48V and to set the Unit ID. It shall be an I/O rack optimized for use with Yamaha DM3 digital mixing console and Yamaha TF series digital mixing consoles. Connection to DM3, TF series or another digital mixer via a Dante network shall provide low-jitter, low-latency audio transmission. Setup shall be fast and easy using the AUTO SETUP functionality of DM3 or QUICK CONFIG functionality of TF series digital mixing consoles. Dimensions shall be 480 (W) x 88 (H) x 364 (D) mm. Weight shall be 5.7 kg.

\*All information subject to change without notice.

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